

THE PAPWORTH VILLAGE SETTLEMENT

Registered Office: PAPWORTH HALL, CAMBRIDGE.

REPORT

OF THE

COMMITTEE OF MANAGEMENT

AND

MEDICAL DIRECTOR

FOR

1947

PRESENTED AT THE THIRTY-FIRST ANNUAL GENERAL
MEETING OF THE SETTLEMENT, JUNE 24TH, 1948

Papworth Village Settlement

NEAR

(INCORPORATED)

CAMBRIDGE

[Founder and first Medical Director : The late SIR PENDRILL VARRIER-JONES, F.R.C.P.]

PATRONS

HIS MAJESTY THE KING

HER MAJESTY QUEEN MARY

HER ROYAL HIGHNESS THE PRINCESS ALICE, COUNTESS OF ATHLONE
MAJOR-GENERAL THE RT. HON. THE EARL OF ATHLONE, K.G.

PRESIDENT

HER ROYAL HIGHNESS THE PRINCESS ROYAL

PAST PRESIDENTS

1918-1925 : THE RT. HON. SIR CLIFFORD ALLBUTT, K.C.B., F.R.S., D.Sc., D.C.L.,
LL.D., M.D., F.R.C.P. (died 1925).

1925-1934 : SIR HUMPHRY ROLLESTON, Bt., G.C.V.O., K.C.B., Hon. D.Sc., D.C.L., LL.D., M.D., F.R.C.P., &c.
(died 1944),

1934-1942 : HIS ROYAL HIGHNESS THE DUKE OF KENT, K.G. (killed on Active Service, 1942).

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Her Grace the Duchess of Atholl

*Sir Edward Baron

Field-Marshal the Lord Birdwood, G.C.B., G.C.S.I.,
G.C.M.G., G.C.V.O., C.I.E., D.S.O.

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of Cambridgeshire

Sir Edmund Crane

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Warwick Deeping, Esq.

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The Lady Guernsey

The Viscount Hinchingbrooke, M.P.

The Most Hon. the Marquess of Linlithgow, K.G.,
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The Marchioness of Linlithgow, C.I.

Sir Arthur MacNalty, K.C.B., M.A., M.D., F.R.C.P.,
F.R.C.S.

The Viscount Nuffield, G.B.E., F.R.S., M.A., D.C.L., LL.D

Her Grace the Duchess of Portland.

Her Grace the Dowager Duchess of Portland, D.B.E.

The Lord Queenborough, G.B.E.

The Rt. Hon. the Earl of Sandwich, H.M. Lord Lieutenant
of Huntingdonshire.

R. S. Whipple, Esq.

The Marchioness of Willingdon, C.I., G.B.E., LL.D.

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VICE-CHAIRMAN

THE MARCHIONESS OF LINLITHGOW, C.I.

HON. TREASURER

J. E. BIDWELL, Esq., M.A. (Cantab.)

HONORARY STAFF 1947.

Hon. Consulting Physicians:

Air Vice-Marshall Sir John Conybeare, K.B.E., M.C.,

D.M., F.R.C.P.

Maurice Davidson, Esq., M.D., F.R.C.P.

Sir Percival Horton-Smith Hartley, C.V.O., M.D.,
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F. R. G. Heaf, Esq., M.A., M.D., F.R.C.P.

The Lord Horder, G.C.V.O., M.D., F.R.C.P.

Air Vice-Marshall Sir Alan Rook, C.B., O.B.E., F.R.C.P.,
D.P.H., K.H.P.

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P. J. Kerley, Esq. M.D., F.F.R., D.M.R.E., F.R.C.P.

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Hon. Physicians:

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W. Paton Philip, Esq., M.C., M.B., Ch.B., D.M.R.E.,
D.P.H.

Hon. Consulting Anaesthetist:

H. N. Webber, Esq., M.A., M.R.C.S., L.R.C.P., D.A.

Hon. Psychologist:

H. Banister, Esq., M.Sc., Ph.D.

Hon. Consulting Surgeons:

E. G. Gask, Esq., C.M.G., D.S.O., M.A., F.R.C.S.

Air Vice-Marshall Geoffrey Keynes, M.D., F.R.C.S.

H. B. Roderick, Esq., O.B.E., M.A., M.D., M.Ch.,
F.R.C.S., D.P.H.

J. S. Paterson Ross, Esq., M.S., F.R.C.S.

Hon. Consulting Laryngologist :

A. S. H. Walford, Esq., M.A., F.R.C.S.

Hon. Consulting Bacteriologist:

G. S. Graham-Smith, Esq., M.A., M.D., D.P.H., F.R.S.

Hon. Legal Adviser:

Professor P. H. Winfield, LL.D.

Hon. Gynaecologist:

Oswald Lloyd, Esq., M.D., F.R.C.S., M.R.C.O.G.

Hon. Orthopaedic Surgeon:

R. Weeden Butler, Esq., M.A., M.D., M.Ch., F.R.C.S.

Hon. Ophthalmic Surgeon:

Graham F. Wright, Esq., M.A., M.R.C.S., L.R.C.P.,
D.O.M.S.

Hon. Dental Surgeon.

W. Baird Grandison, Esq., L.D.S., R.C.S. (Ed.), F.D.S.,
R.C.S., (Eng.)



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GOVERNORS 1947

A. E. Barclay, Esq., O.B.E., M.D. F.R.C.P., D.M.R.E.	Professor H. R. Dean, M.D.	Lady Rolleston
Miss E. Briscoe	Mrs. Marcus Dimsdale	*The Countess of Sandwich
*Capt. R. G. Briscoe, M.C.	Mrs. G. F. C. Gordon	Mrs. J. L. Smith
†J. E. Bidwell, Esq., M.A.	Mrs. A. V. Hill	Mrs. Stewart
*Miss E. M. Boake, R.R.C.	The Viscount Hinchingbrooke, M.P.	Ashley Tabrum, Esq.
W. Bulkeley-Evans, Esq., C.B.E., LL.D.	Lady Hope	Mrs. Robert Tritton
*F. Bennett, Esq.	Mrs. W. Jenyns	R. S. Whipple, Esq.
*Mrs. J. F. Cameron	Dr. J. N. Keynes	*Sir Lionel Whitby, C.V.O., M.C., M.D., F.R.C.P.
Miss H. Chivers	*Mrs. Keynes	*Lady Whitby
E. Mellish Clark, Esq.	The Marchioness of Linlithgow, C.I.	*I. Winterbottom, Esq.
Mrs. Mellish Clark	*G. M. Macfarlane-Grieve, Esq.	
The Viscount Clifden	*Talbot Peel, Esq., M.A.	
Miss Courtauld	The Lord Queenborough, G.B.E.	A. H. Wooll, Esq.

Alderman W. Brown (Hunts. C.C.) and Dr. Robert Ellis (Cambs. C.C.) are
co-opted Members of the Committee of Management.

† denotes Chairman of Committee of Management. * denotes Member of Committee of Management.

EXECUTIVE STAFF 1947

MEDICAL DIRECTOR :

R. R. TRAIL, M.C., M.A., M.D., F.R.C.P.,

CHIEF MEDICAL OFFICER :

L. B. STOTT, M.C., J.P., M.B., B.Ch.,
D.P.H.

MATRON:

MISS E. M. ROBINSON, S.R.N.

SECRETARY :

T. C. M. JOHNSON, F.H.A.,

GENERAL MANAGER:

PAPWORTH INDUSTRIES:
B. TALLYN

TREASURER:

L. F. PAPE, A.C.A., A.H.A., F.I.A.C.

WORKS MANAGER:

PAPWORTH INDUSTRIES:
A. GROGAN

MEDICAL STAFF

First Chief Assistant Medical Officer :

R. B. Murphy, M.B., Ch.B., B.A.O.

Chief Clinical Assistant Medical Officer :

J. M. Battersby, M.A., M.R.C.S., L.R.C.P.

Physicians :

E. H. Hudson, M.A., F.R.C.P. J. B. Hunter, C.B.E., M.C., M.A., M.Ch., F.R.C.S.
K. M. A. Perry, M.A., M.D., F.R.C.P.

VISITING STAFF :

Surgical Director :

R. A. Bowen, M.R.C.S., L.R.C.P.

Assistant Surgical Director :

I. C. W. English, M.R.C.S.,

L.R.C.P.

G. Kent Harrison, M.D., F.R.C.S.

Anaesthetists :

Research Pathologist :

E. Brieger, M.D.

Clinical Pathologist :

D. Barron Cruickshank, L.R.C.P. & S. (Edin.),
L.D.S. (Edin.), D.P.H. (Camb.)

CHAPLAIN: Rev. G. W. F. Coupe.

BANKERS:

Barclays Bank, Ltd.
Cambridge.

AUDITORS:

Cambridge : Peters, Elworthy & Moore.
London : Barton, Mayhew & Co.

REGISTERED OFFICE:

Papworth Hall,
Cambridge.

APPEALS SECRETARY: DENIS BENWELL
16, GROSVENOR PLACE, LONDON, S.W.1.
TEL : Sloane 2115

MEDICAL CONSULTATIVE COMMITTEE

*R. R. Trail, M.C., M.A., M.D., F.R.C.P., Medical Director (Chairman)

F. R. G. Heaf, Esq., M.A., M.D., F.R.C.P.

Sir Arthur MacNalty, K.C.B., M.A., M.D., F.R.C.P.,

*J. B. Hunter, Esq., C.B.E., M.C., M.A., M.Ch.,
F.R.C.S.

F.R.C.S.

P. J. Kerley, Esq., M.D., F.R.C.P.,
D.M.R.E., F.F.R.

Wilfrid Sheldon, Esq., M.D., F.R.C.P.

*Sir Lionel Whitby, C.V.O., M.C., M.D., F.R.C.P.

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Professor S. P. Bedson, F.R.S., M.D., M.Sc., B.S.,
F.R.C.P.

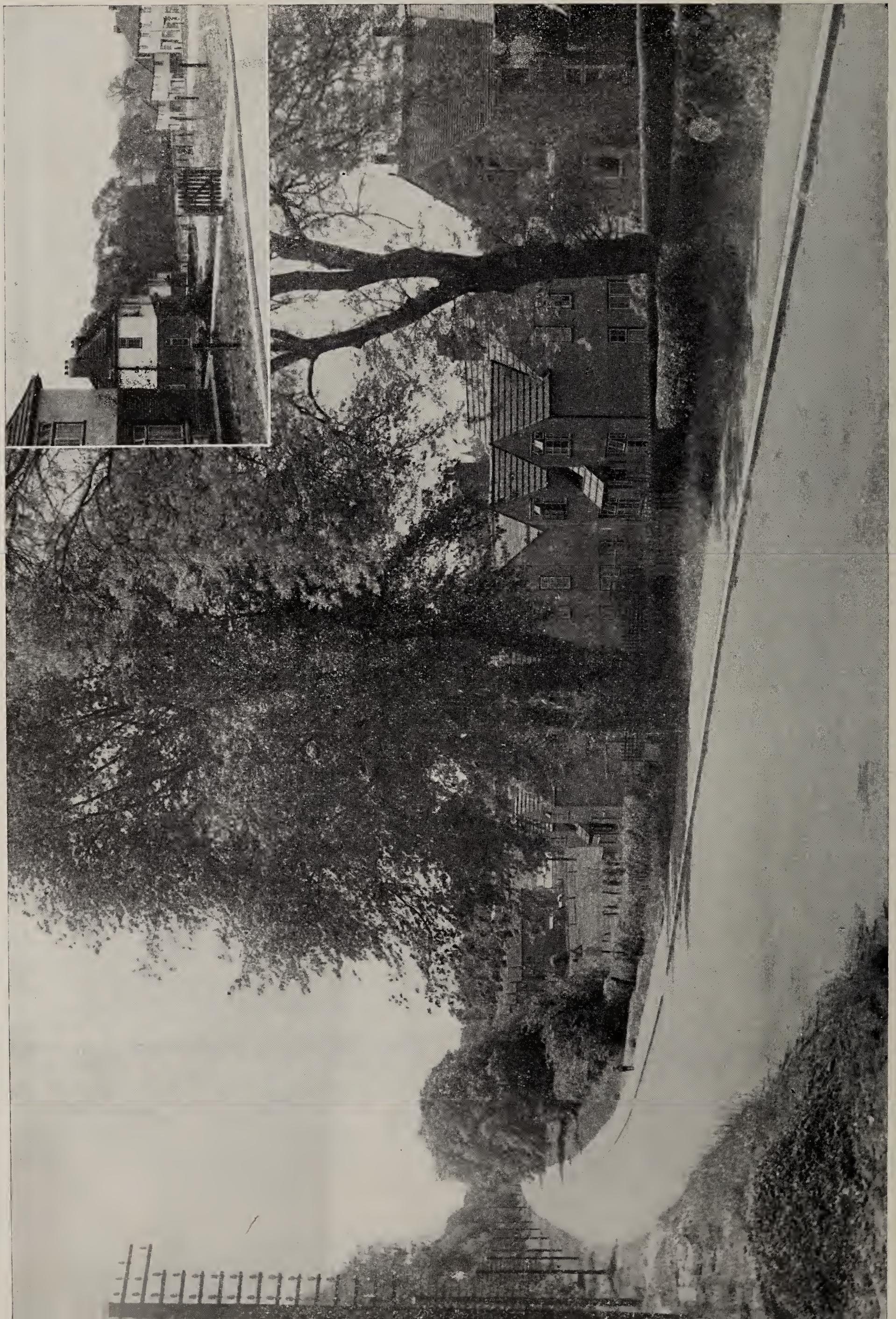
F. R. G. Heaf, Esq., M.A., M.D., F.R.C.P.

Professor O. L. V. de Wesselow, D.M.,
B.Ch., F.R.C.P.

Professor W. H. Tytler, D. Sc.

* denotes Member of Committee of Management.

A view of the North end of the village. Inset: the Pendragon Estate.



REPORT OF THE COMMITTEE OF MANAGEMENT, 1947.

FOR many reasons the year 1947 was one of outstanding importance for the Settlement. In the first place we were honoured by a visit from our President Her Royal Highness The Princess Royal on the 23rd July. Her Royal Highness's interest in Papworth remains unabated and her presence invariably represents a red-letter day to every member of the Settlement. The principal object of Her Royal Highness's visit on this occasion was to lay the foundation stone of the "Edith Edwards" Children's Home. Mrs. R. G. Edwards, M.B.E., the generous founder of the fund for this purpose was present together with many members of her Committee, and it is a source of real satisfaction that it is now possible to make definite progress in carrying out this valuable addition to the needs of the Settlement after the enforced delay caused by the War. Her Royal Highness spent a full day at Papworth and made a very thorough inspection of the Hospital Section of the Settlement and also of the Industrial Section.

An important and far-reaching improvement has now been carried out in the centralizing of the general catering arrangements of the Institution, and a Catering Officer, Miss Clay, has been appointed and has taken charge of this Department under the direction of the Matron, Miss Robinson. The new arrangements are working smoothly and well and have already proved of great advantage to the patients.

The acute shortage of Nurses is still our worst trouble in dealing with advanced cases, in spite of the fact that

the Committee willingly sanctioned the special allowances recommended by the Rushcliffe Committee for long-term tuberculosis nursing. So serious has been the difficulty of providing a sufficient number of nurses for bed cases that the Medical Consultative Committee advised the placing of certain restrictions on the type of cases to be admitted and with reluctance the Committee had no alternative but to adopt this recommendation.

Owing to the continually increasing rise of costs of all kinds, it was found necessary twice during the year to make some increase in the charges for maintenance. These increases have been generally accepted since it is obvious to everyone that all Institution costs are mounting. In spite of these increases there will inevitably be some deficit on the year's running-costs and it is almost impossible to budget ahead to cover all future contingencies.

During the year the Farm House at Fir Tree Farm, which was not required by the new tenants of the Farm, has been taken over by the Committee and converted to provide accommodation for Male Nurses who are now employed to help in staffing the wards.

On the Industrial side the outstanding event of the year was the stoppage of work caused by the fuel crisis early in the year. As the Industries' workshops depend entirely on electricity for power it will be readily understood how serious was the effect of this crisis. Great credit is due to the Manager, Mr. Tallyn, and the heads of Departments for their action in instal-



The Bernhard Baron Hospital for Men, containing 109 beds.

ling without delay auxiliary generators, and it is satisfactory to report that the workshops were able to restart at full capacity without suffering any serious setback. Every effort was made during the year to increase the export market, and a decision was reached to establish an agency in the United States for the sale of the Industries' Travel and Leather Goods.

During the year it has been possible to complete thirteen prefabricated houses, built entirely in our own workshops, and these houses have proved very popular with Settlers. In addition three pairs of permanent brick-built houses designed on the Settlement's model plans have been completed. A start was made during the year in the building of the first wing of the new South Park Block for which a licence was obtained after much delay.

At the beginning of the year at the request of the Medical Director a Social Worker living in the Settlement, Miss Taylor-Davies, was appointed and her work amongst the patients has proved most valuable.

The two new Members of the Committee Lady Whitby and Miss E. M. Boake with the addition of Capt. Briscoe and Mr. Macfarlane Grieve, have been appointed as a House Committee to superintend in conjunction with the Medical Director and the Matron the running of the Hospitals, Hostels, etc.

We have to report with much regret the death of our Ophthalmic Surgeon, Mr. W. G. Watson. We have appointed Dr. Graham Wright as his successor.

Professor Paterson Ross who has been a member of the Medical Consultative Committee since its foundation has, to our great regret, been obliged to resign owing to pressure of work.

The thanks of the Management are due to him for his valuable interest and help in the development of Papworth in the past.

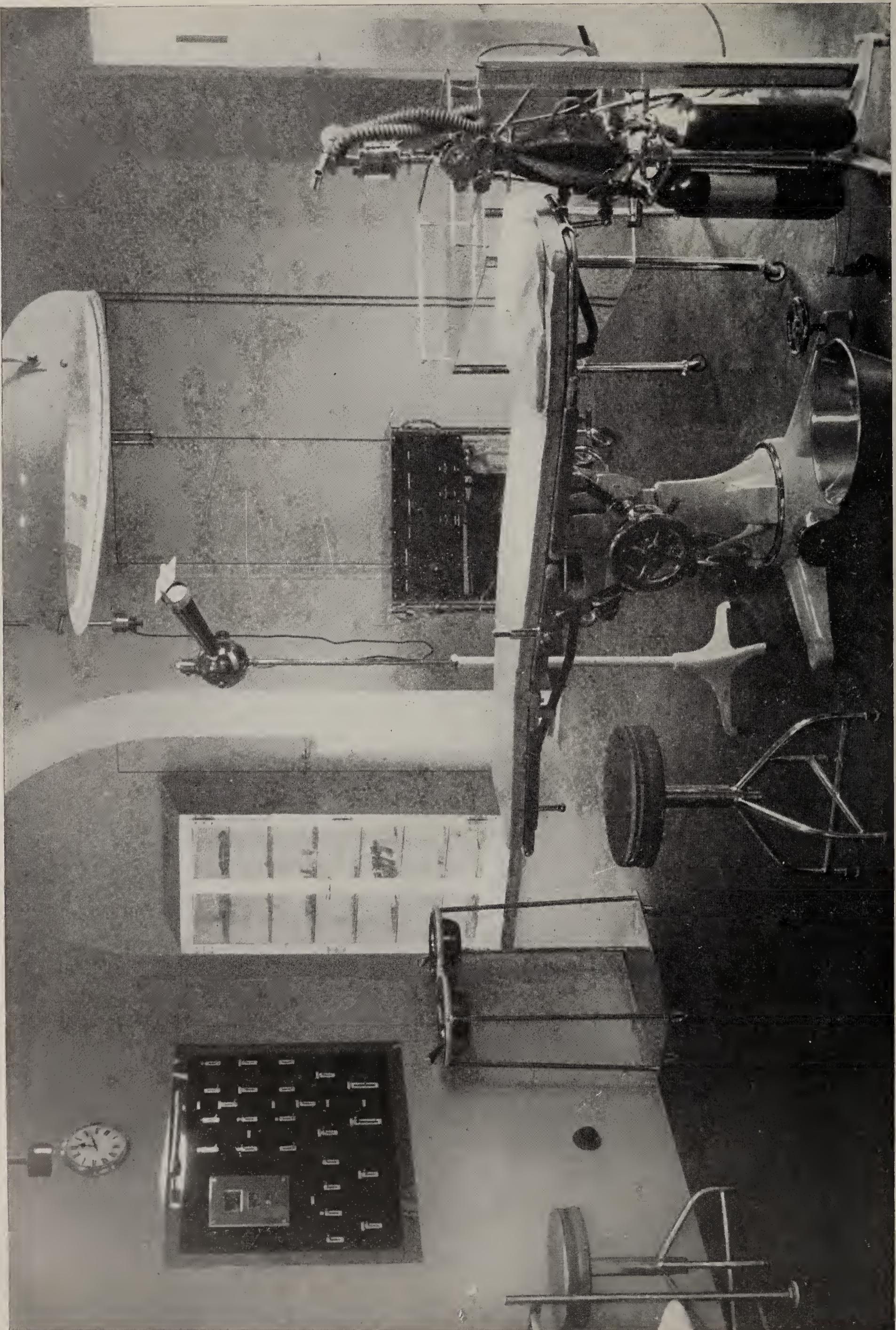
Mr. O. S. Tubbs, our Visiting Thoracic Surgeon, resigned in November, owing to pressure of work connected with his London appointments. A new appointment has been made, after advertising in conjunction with Addenbrooke's Hospital, Cambridge, for a Thoracic Surgeon for the Region, in Mr. Kent Harrison who has now taken up his duties.

With a view to altered conditions under the National Health Service we have at the request of the Education Council of Cambridge University and Addenbrooke's Hospital (the Teaching Hospital for the Region), undertaken to accept Post-Graduate Students in Chest Diseases at Papworth, and in order to provide the necessary accommodation we have purchased a private residence in the neighbourhood known as Wimpole Lodge which can be used as a Hostel and will accommodate up to twenty Students.

Our very grateful thanks are due to the Members of the Honorary and Visiting Staffs and to the Hospital Guild for their valuable help which is genuinely appreciated. Mention must also be made of the special effort made by the Guild, on the initiative of Lady Whitby, in starting a Mattress Fund by means of which all the 200 hospital beds have been supplied with interior spring mattresses.

Finally the Committee desires to express grateful recognition of the ever loyal and devoted service rendered during the year by the Medical Director and all members of the Staff, both Hospital and Industrial.

J. E. BIDWELL,
Chairman.



The Operating Theatre, Nelson-Langermann Hospital.

REPORT OF THE MEDICAL DIRECTOR

I HAVE the honour to present the Annual Report for the year ended December 31st, 1947.

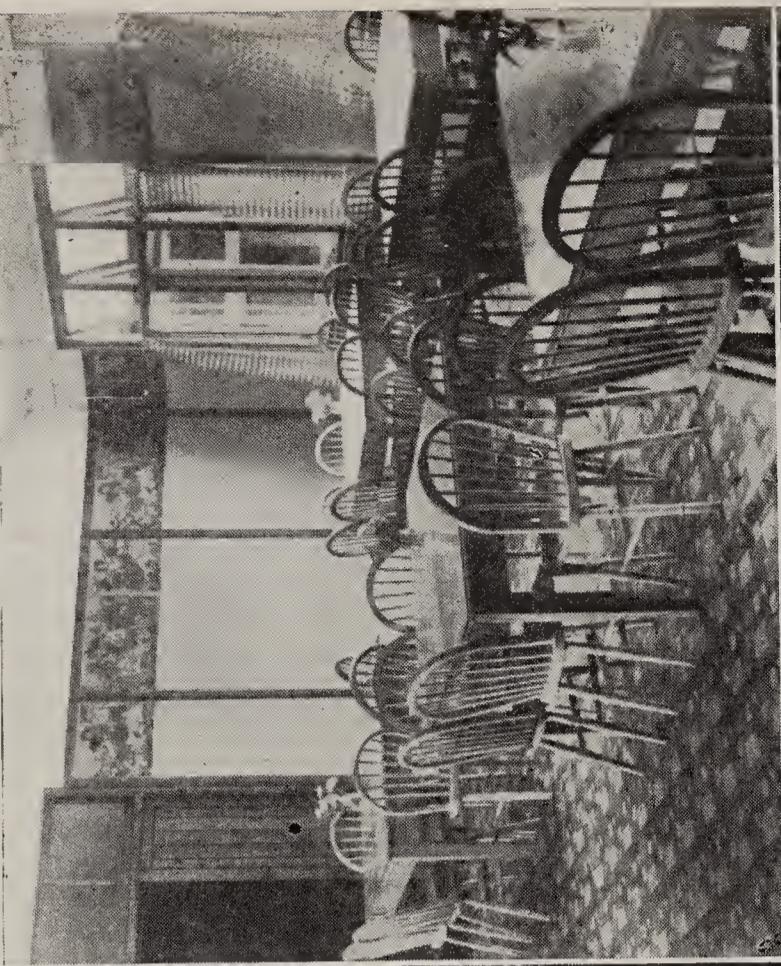
During the whole of this year, discussions have been in progress with the Ministry of Labour and the Ministry of Health with a view to finding a scheme, acceptable to these Ministries and to the Settlement, which would enable the tuberculous to benefit from the provisions of the Disabled Persons' Employment Act (1944). The Act allows for training-grants for all registered disabled persons fit for an eight hours' day, and is therefore of no use to the tuberculous under rehabilitation, where such rehabilitation takes place during, and as part of treatment. It has always been the prime principle of Papworth that these should be combined to the benefit of both, whether the patient for whom they are provided decides to settle in the Village or return to his own or another outside employment. He should not, as is abundantly proved by the after-histories of sanatorium-treated patients, return to an eight-hour day under normal conditions of outside industry under a period of some two years from the date at which he is, by normal sanatorium standards, considered fit for discharge from residential treatment.

The scheme which we sought from the Ministries, and which will come into operation early in 1948, recognizes this particular disability of the tuberculous, and secures for every man and

woman who elects to enter it the same allowances as are available for other forms of disablement, even when the patient is fit for only three hours per day in sedentary employment, learning a trade by which he can eventually earn his living and support his dependants.

The scheme is to be available for present and future patients in our Hospitals, and also to those who have received treatment in other sanatoria and wish to come to Papworth for rehabilitation and continued observation on our principles. This means they must have disease not beyond the moderately advanced stage, be fit to be up all day, and to take one hour's walking exercise before transfer to Papworth. Their assessment will be on a basis agreed between the Sanatorium Medical Officer and Tuberculosis Officer on the one hand and the Medical staff of Papworth on the other.

We believe this scheme to be a distinct forward step in Social Medicine, especially as it is to be made applicable to other Village Settlements throughout the country. It should do much to remove any sense of grievance among the tuberculous who have contracted their disease through no fault of their own and who are in every sense as worthy of Government aid as the sufferers from orthopaedic disabilities. It should at the same time do much more than was possible under 266/T, because it offers continued aid for some two years to the married



St. Mary's Hostel for Women contains 67 beds. Inset : Interior of Dining Room.

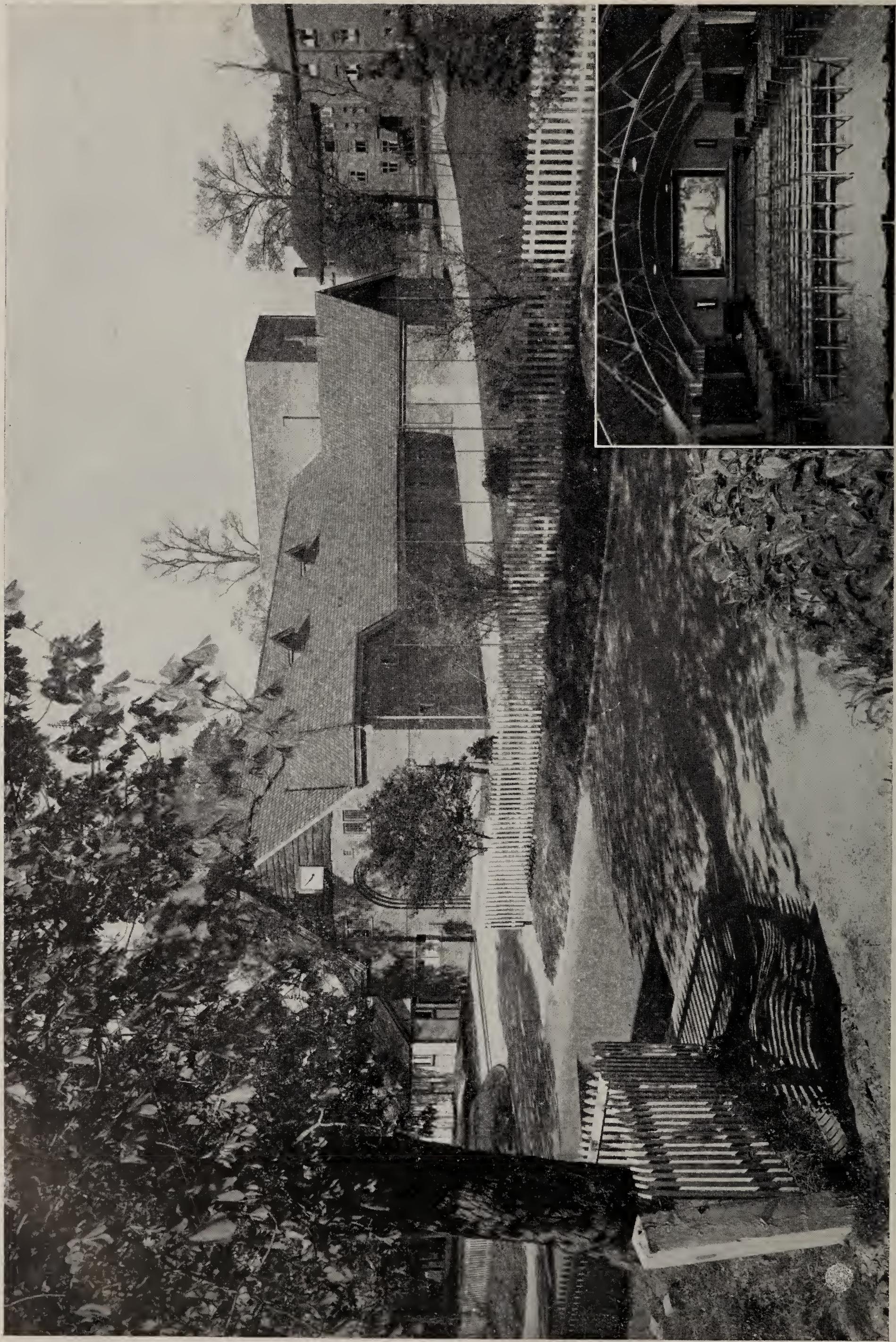
man who all too often cuts short his period of treatment and rehabilitation because of his anxiety for his wife and children. We believe also, that it will show distinct returns in national economy by saving life, by cutting down the numbers of breakdowns which necessitate further treatment,

and by adding to the numbers in industry, now so urgently required, men and women who work with a will because they can attain independence of charity and retain their self-respect.

R. R. TRAIL,
Medical Director.



Papworth Hall.



The Pendragon Theatre. Inset : Interior view.

GENERAL MEDICAL STATISTICS

			Men	Women	Total
Admissions	...	...	186	116	302
Discharges	...	...	209	120	329
Average No. under Treatment	...	...	345	128	473
Total treated during year		487	260		747
Service patients admitted		37	1		38

SURGICAL UNIT (THE NELSON-LANGERMANN HOSPITAL)

Surgical Director,
J. B. Hunter, C.B.E., M.A., M.C., M.Ch., F.R.C.S.
Visiting Thoracic Surgeon (to November 1947),
O. S. Tubbs, F.R.C.S.
Asst. Surgical Director (from November),
G. Kent Harrison, M.D., F.R.C.S.
Consulting Hon. Anaesthetist,
H. N. Webber, M.A., M.R.C.S., L.R.C.P., D.A.

Operations performed during 1947 : Thoracoplasty

Total number completed during 1947		32
Total number of stages...	...	80
Thoracoscopies	...	23
,, and adhesion section	...	65
Extra-Pleural Pneumothorax	...	1
Phrenic Crush	...	133
Bronchoscopies	...	24
Removal of Scapula	...	1
Orthopaedic (Mr. R. Weeden Butler)		
Excision of bursa from Gt. Trochanter		1
Other minor operations	...	5
Patients admitted direct for surgical treatment	Men	Women
	34	43

Follow-up of thoracoplasties

In conjunction with the Research Dept., a scheme is in operation for the "follow-up" of thoracoplasties.

REHABILITATION STATISTICS

Patients colonized :		Men	Women	Total
Institution	...	8	3	11
Industries	...	22	4	26
				37

X-RAY DEPARTMENT

E. W. Groves, M.S.R.

The figure for the total work done is 3.8% down on that for 1946 ; this may be in part explained by some limitation of activity during the weather and fuel crisis early in the year, as the total figure for February was considerably lower than the monthly average.

There was a continued and growing demand for tomography, and the figure for the year is about one-third up on that for 1946.

During the year the department had a number of calls on its resources to supply material for lectures and demonstrations, not only for resident members of the medical staff, but also for ex-members occupying positions in the Ministry of Pensions, the Ontario Immigration Scheme at Rainbow Corner, and the Tuberculosis Service of Northern Ireland.

Included in the 123 reduced prints and lantern slides made during the year, was a series of 87 for a Thesis on Collapse Therapy by Artificial Pneumoperitoneum.

The following analysis gives an idea of the scope of the work undertaken during the year under review.

Bernhard Baron Hospital :

X-Ray photographs 6,584
Reduced prints and lantern slides ... 123

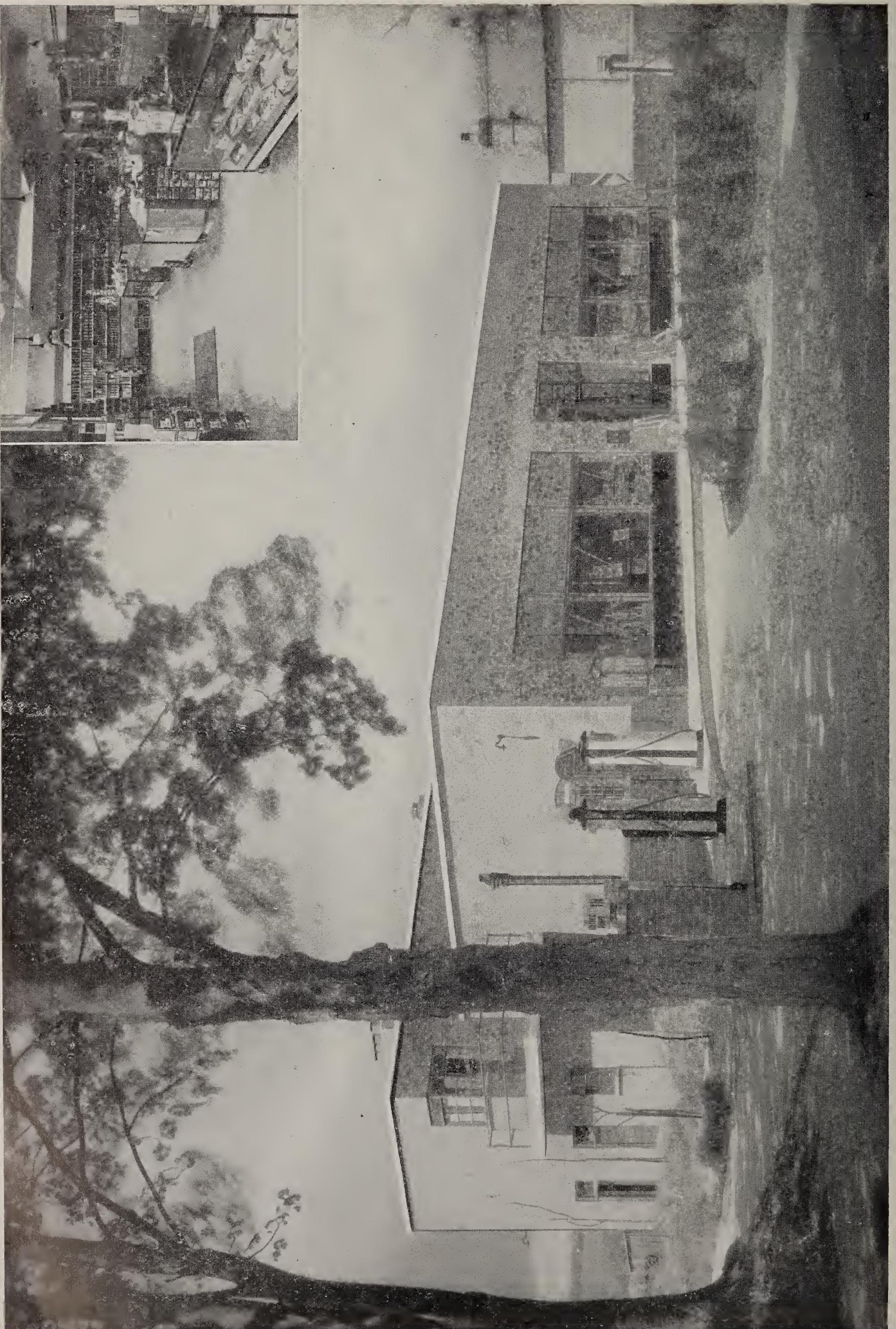
Analysis of films taken :

Chests ...	...	...	...	...	4,683
Bronchograms	...	...	...	...	47
Pyelograms	...	...	...	...	40
Tomograms	...	...	...	...	1,256
Ba. Meals and Enemas	...	...	...	...	40
Bones and Joints	...	...	...	...	408
Obstetrics	...	...	...	...	9
Dental ...	...	...	...	...	53
Nasal Sinuses ...	...	...	...	...	31
Other types	...	...	...	...	17

Analysis of Categories of patients

X-Rayed :

In-patients	...	...	...	...	2,165
Adult Villagers	...	...	...	...	889
Children of school age normally resident in the Settlement	...	...	...	...	206
Hosp. Special and General Staff	...	...	...	...	345
Patients referred by local authorities and local practitioners	...	...	...	...	393
Private Patients	...	...	...	...	68
Visitors	...	...	...	...	24
Papworth Industries personnel	...	...	...	...	461



The Village Stores. Inset : A section of the Provisions Department and Post Office.

**Vaughan X-Ray Dept.,
Nelson-Langermann Hospital :**

Films (All chest)	227
Patients	217
Portable Unit :	
Chests	62
Abdomen	1
Bones and Joints	8
	71

The portable unit was used in wards, settlement houses, hostel, casualty surgery, and a neighbouring village. It was also lent on two occasions to a neighbouring institution for emergency work while the plant there was temporarily out of commission.

Grand Total :

6,882 films of 5,278 Patients

OUT-PATIENTS DEPARTMENT

Sister E. M. Woods, S.R.N., T.A.

Number of attendances for Year :

Morning Visits	3,365
Evening Visits	1,807
New Cases	807
A. P. Refills	3,153
	—
TOTAL	9,132

Dental Clinic

W. Baird Grandison, L.D.S., R.C.S. (Edin.), F.D.S., R.C.S. (Eng.).

No. of Sessions	96
„ „ Attendances	1,442
„ „ Fillings	478
„ „ Extractions	493
„ „ Scalings	217
Teeth treated with nitrate of silver	59
Gum Etc., Treatments	276
X-rays	122
Dentures supplied	68
Dentures repaired	52
Other operations	291

The above statistics which cover the period from January 1st 1947 to December 31st, 1947 indicate that, excluding the holiday month, one whole day each week has been required to care for the dental needs not only of patients in hospital but also for a number of adults in the Settlement which forms so important a part of the original Papworth Scheme and which, it appears to me, is indivisible from it. Attendances are large and amount to an average of 15 per day, but it must be understood that it is not always possible to give complete treatment to every patient, on

account of their medical condition. Under the circumstances, therefore, it is gratifying to note that the number of conservative operations is comparatively high for hospital dental practice and that the number of dentures supplied is less than in previous years.

Selection of patients as a rule is essentially dependent upon medical recommendation and I desire to express to the Chief Medical Officer, Dr. L. B. Stott, and to the Medical Staff my thanks for their appreciation of the value of dental treatment as an aid to the promotion of general health. It is with gratitude too, that I acknowledge so much co-operation from the research department of the Hospital and desire to express my thanks in particular to Dr. D. Barron Cruickshank.

Physiotherapy Clinic

Mrs. G. W. F. Coupe, M.C.S.P.

From January to July, 1947, this department was run on a full-time basis and the time was divided equally between work in the Out-patients Department, (giving various forms of treatment to those in the Village and Industries who required it) and work in the Hospitals—chiefly on the Surgical Block.

In July Miss Michell was married and from that time the department was open in the mornings only.

The forms of treatment included Faradism, Infra-red irradiation, Ultra-Violet Light, Massage and Remedial Exercises.

The total number of attendances for the year was 4,157, of which 1,680 were out-patients, 2,477 in-patients, and 34 thoracoplasty patients, the latter being treated before, and through, their various stages.

Ophthalmic Clinic

G. F. Wright, M.A., M.R.C.S., L.R.C.P., D.O.M.S.

This department was taken over by Mr. G. F. Wright in September 1947, after the death of Dr. W. G. Watson.

The work done consists mainly of refractions with a sprinkling of examinations and treatments of various pathological conditions.

A regular monthly visit has been made.

Refractive errors and ocular imbalance soon make themselves manifest when patients are reading more than is their wont and in addition are debilitated.

A few cases have been referred to Addenbrooke's where further investigation and treatment were necessary.

Total number of cases examined was 93.

Orthopaedic Clinic

R. Weeden Butler, M.A., M.Ch., M.D., F.R.C.S.

We would like to express again our sincere gratitude to Mr. Butler for attending once a month to see the orthopaedic patients. His diagnoses of cases and valuable advice regarding treatment are greatly appreciated. During the year 1947 the total number of patients seen was 275, of whom 163 were outpatients from the village, hostels and Industries and 112 were bed-patients in the Hospitals. Fifty-six new patients were seen.

Psychological Clinic

H. Banister, M.Sc., Ph.D.

Further patients—a somewhat smaller number than in recent years—have been treated during 1947 in sixty-one treatment sessions. The decrease in numbers is interesting in view of the increase in the number of individuals, both child and adult, in the general population who are now receiving psychological treatment as compared with the war and pre-war years.

The increase in the psycho-neurosis generally is to be expected both as the aftermath of the strain of the war years, and because of the difficulties of the present. It may be that these increases in strain are less marked at Papworth where, in some ways, life is easier than it is outside.

The results of the year's work are satisfactory on the whole.



Bookbinding Department.

RESEARCH DEPARTMENT

E. M. Brieger, M.D.

B. R. Smith, B.Sc., Research Assistant

A. Johnson, Laboratory Assistant

BACTERIOLOGY AND PATHOLOGY

The research work carried out during the present year is described below under three headings :

1. Life-History of Mycobacteria.
2. Host-Parasite Relationship in Tissue Culture.
3. Methods for the assessment of the action of Chemotherapeutic Agents.

I. Life-History of Mycobacteria.

(a) *A study on the reproductive changes in mycelial variants of avian strains compared with those in the original strains.*

In a paper now in the press⁽¹⁾ it was shown that the reproductive mechanism of avian tubercle bacilli differs from that of ordinary bacteria, but suggests closer relationship to actinomycetes. This question was further investigated by studying the life-history and growth-habit of mycelial variants which we were able to obtain from several of our strains, one of them freshly isolated from a tuberculous fowl.

Special attention was given to the question raised by Professor Bedson about the effect of oxalic acid on the non-acidfast elements, and this question will be dealt with in a separate publication which is being prepared.

(b) *Electron microscope study of reproductive changes.*

In conjunction with Dr. E. V. Cosslett, F.Inst. Phys. (who is in charge of the Electron Microscope Dept. of the Cavendish Laboratory) and Mr. G. R. Crowe, we continued our study on the developmental changes of avian strains (mycelial and non-mycelial strains) by the Electron Microscope. By using a special stripping-technique, described in a short note to *Nature* ⁽²⁾ we could demonstrate characteristic changes in the internal structure during the first stage of the development.

(c) *Direct observation of growth-habit and development of avian strain grown on non-transparent media by oblique incident illumination.*

The observation of developmental changes in living material by darkground illumination was not successful, because the tubercle bacillus does not grow sufficiently well in hanging drops between coverslips and slide.

The technical problem of examining living organisms in a reflected light was solved by using annular oblique incident illumination (Ultrapak). This work was carried out in conjunction with Mr. J. Smiles of the National Institute of Medical Research, Hampstead, and his assistant, Mr. Welch. A demonstration on the results obtained will be given at the meeting of the Pathological Society on 2nd January of next year.

(d) *Reproductive changes in avian tubercle bacilli compared with that in non-pathogenic mycobacteria :*

In the course of these investigations it became more and more evident that the reproductive mechanism of avian tubercle bacilli is of a much more complex nature than hitherto assumed. We have given special consideration to the problem of the atypical forms, especially the peculiar granular foci described by the writer (*Journal of Path. and Bact.* 1945), which might be identical with the "zoogloic forms" recently described by Alexander Jackson, New York. To arrive at an interpretation of these atypical changes we started on a comparative study investigating the life-history of non-pathogenic mycobacteria, the result of which will be ready for publication next year.

In order to make this study on the life-history of mycobacteria as comprehensive as possible, we evolved the following scheme. Each week an experiment was put up at Papworth, samples taken at intervals of a few hours up to six days and examined (a) by ourselves in stained preparations and direct observation in transmitted light, (b) in the Electron Microscope, and (c) by oblique incident illumination.

Material that accumulates from these investigations and which, thanks to the joint effort, is new in many aspects is being collected and filed, with the assistance of a secretarial staff of a colonist and a patient, with the aim of building up gradually a monographic treatise on the life-history of mycobacteria of the pathogenic and saprophytic types.

2. Host-Parasite Relationship in tissue culture.

(a) *Observation on the interaction between tubercle bacilli (of the avian and bovine type) and the tissues of adult rabbits and fowls cultivated in vitro.*

Our observations on the host-parasite relationship in tissue culture⁽³⁾ using virulent



Machine Section, Printing Department.

avian tubercle bacilli and embryo chicken lung have been continued in conjunction with Dr. H. B. Fell, Director, Strangeways Laboratory. We began a new study infecting glandular and spleen tissues from adult rabbits with virulent bovine and avian strains in order to discover whether tissues from susceptible hosts respond in the same way to avian and bovine bacilli. Our results indicate that each type has its own specific effect on the tissue culture.

(b) *Tissue-culture experiments with tubercle bacilli of the human type carried out at Papworth.*

In view of our findings described under (a) we have decided to undertake a more comprehensive survey on the question of Species Pathogenicity in tissue culture, using avian, bovine and human tubercle bacilli for infection of spleen tissues from rabbits, chickens, rats and guinea-pigs, thus cross-testing the various

types of mammalian tubercle bacilli with the tissues of naturally susceptible and resistant hosts. For this purpose we decided to divide our efforts and to make simultaneously tissue-culture experiments with the human and bovine strains at Papworth, and the avian and bovine strains at Strangeways.

We started tissue-culture work at Papworth with human and avian bacilli in September and hope to be ready for the joint experiment early next year.

(c) *A comparison of the tissue response in vitro and in vivo.*

Our findings were suggestive that the mechanism of infection in vivo differed in many aspects from that observed in tissue culture. To prove this fact I have undertaken a series of animal experiments, using facilities granted to us at the Department of Pathology, Cambridge, by Professor Dean, where we still have the use of laboratory facilities.

This involved a large amount of histological and cultural work, which was undertaken by Miss B. E. Smith, with the assistance of a patient who has a London Science degree and is also experienced in histological research.

(d) *Growing infected tissues in vitro.*

We have also made the pilot experiments for a study which we intend to take up as the third in this series of investigations. We removed the draining mediastinal glands one week to three weeks after intrapulmonary infection and grew parts of tissue in vitro in the usual way. We found that the tissue explants, although containing only a very small number of bacilli, were rapidly overgrown by a mass of bacilli. In spite of this, however, the cultures themselves grew well, produced a normal outgrowth, the cell of which contained small numbers of bacilli, apparently without suffering any noticeable damage. We used virulent bovine bacilli for this experiment and varied the infected dose, and we hope that these experiments will throw some light on the mechanism of tuberculous infection.

3. Methods for the assessment of the action of chemotherapeutic agents.

Many of the experiments mentioned under (1) and (2) can be made useful for a study of chemotherapeutic problems. I have studied carefully during the present year the requirements arising from streptomycin treatment and tried to make our methods useful for the clinical use of the new drug. The technique which I have evolved includes : (1) Microculture for sensitivity tests ; (2) In-ovo infection with subsequent culturing of the amniotic fluid and parts of the embryonic membranes ; and (3) Experimental infection with subsequent tissue-culturing of the draining glands. The last two methods would be a valuable method for assessing the action of chemotherapeutic drugs in the living organism. In the next year our work in Papworth will be mainly concerned with this line of investigation.

The nature of the research-work done during the past year required a very high standard in media making, as we had to use a variety of artificial as well as biological media. Miss Johnson, who is in charge of this section of our work, did at first make our media at the Department of Pathology in Cambridge, with the kind permission of Professor Dean, where she had the advice of the technician in

charge of the media-kitchen. Gradually, however, the preparation of our media has been transferred to Papworth. We have found plasma embryo extract mixtures an excellent biological medium, and are now trying to compare it in micro-culture with the Dubos medium. Professor Dubos of the Rockefeller Institute has seen our work when he was at Cambridge and has given us very valuable information on the application of this method.

Other Activities

It has been necessary to devote all our time to develop the research programme outlined above.

Records were filed to keep the "Papworth Families" up to date.

Evaluation of results of our previous work on the assessment of working-capacity is now near completion.

Publications during 1947 :

- (1) Brieger, E. M., and Robinow, C.F. : *Jnl. of Hygiene*, in print.
- (2) Brieger, E. M., Crowe, G. R., Cosslett, V. E. : *Nature*, Dec. 20th, 1947, Vol 160 p. 864.
- (3) Fell and Brieger : *Jnl. of Hygiene*, 1947, Vol. 45 p. 359.

Demonstrations :

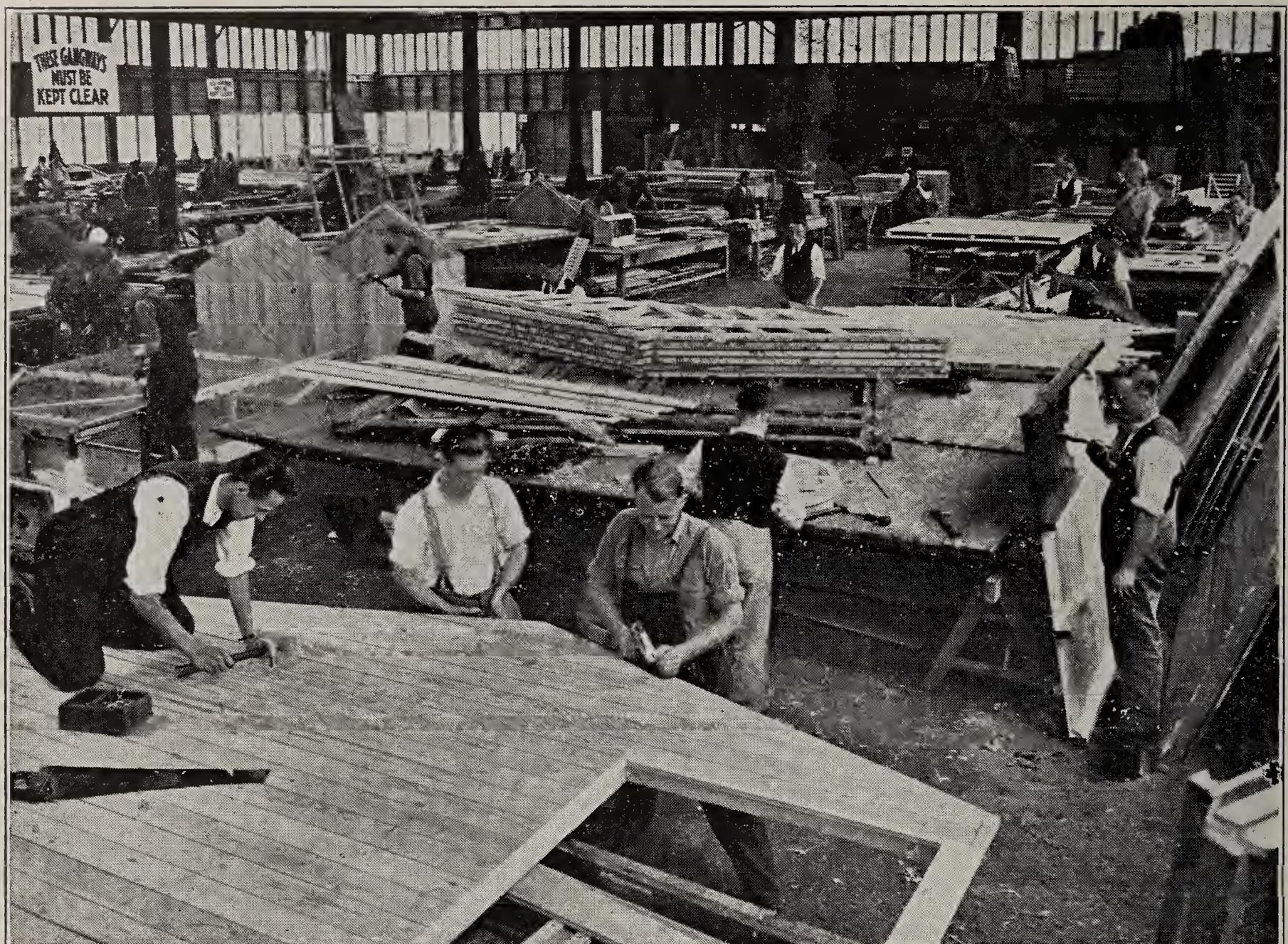
At Leeds in September 1947 : Conference of the Electron Microscope Group, Institute of Physics.

At Cambridge : First meeting of the East-Anglian Pathologists on Electron Microscopy.

**THE SIMS WOODHEAD
MEMORIAL LABORATORY**

D. Barron Cruickshank, L.R.C.P. & S. (Edin.),
L.D.S. (Edin.), D.P.H. (Camb.)
Technical Asst. : F. Boot, A.I.M.L.T.

Over a period of years the routine "reporting" functions of the laboratory have steadily increased, particularly in the bacteriology and haematology sections. Contrasting a few items for 1944 and 1947 we find, e.g. "Microscopic preparations" 2323 : 5365, "Penicillin Sensitivity Tests and Dispensing" 0 : 1573, "Transfusion grouping and cross-matching" 0 : 854. Not only has this increased work called for additions to the technical staff but has also absorbed an increasing proportion



The Carpentry Department.

of the Clinical Pathologist's time. As a result such research as it has been possible to carry out has of necessity been related very closely to the routine work of the department, i.e., has been "applied" rather than "fundamental." I believe that this trend is advantageous and it certainly helps to satisfy a not-inconsiderable immediate demand for information on current methods and techniques. In any case we are still fortunate enough to have a small residue of time which can be devoted to more academic or "pure" research problems.

I. SPUTUM

The primary motif has been an intensive experimental study of various aspects of routine sputum examination. Despite the almost historic antiquity of this procedure, there is a surprising lack of definite and specific information on many important aspects both of technique and of result interpretation.

In order to obtain "definite answers" to many points, this programme of work was developed.

Apart from a paper titled "Towards Fluorescence Microscopy" (*Tubercle May 1947*) and a letter to the *Lancet* in the previous year, this work is as yet unpublished, although much of it has been presented at the T.E.I. Refresher Course on the Pathology and Bacteriology of Tuberculosis held at Oxford in September of this year. The MS. of the first two (or three) communications which will cover this work is at present in draft. Its general scope is sufficiently indicated by the following tentative list of sub-headings.

The Bacteriological Significance of the "Direct Smear Z.N. Examination"

Field Counts : Visual Classification of Positives : Effects of Heterogeneity. The Distribution of Bacilli in Direct Smears. The "grouping" of bacilli : The "crudity" of direct microscopy : Discrepancy between observers. The limit of direct microscopy :

The bacteriological significance of the "limit." The transition ZN-negative to Culture + positive. The quantitative effect of F.M. and concentration on the "limit" value etc.

The Mechanics of Culture Technique

How many tubes of cultures media should be used for each specimen? What interval should elapse before discarding negative tubes? Qualitative discrepancies in the tube and co-tube. Quantitative discrepancies: Absolute discrepancies (one +, co-tube — negative): Frequency distribution of colony counts: Interbatch variations: Micro-positives: Micro-negatives. Failure to grow: Contamination rates: Double contaminations.

General Aspects of Sputum Examination

The scope of this intended third sectional communication is as yet undefined but will cover important aspects omitted in above. Probably the main theme will be "restatement of bacterial standards."

2. CANCER AND TUBERCULOSIS

Pursuant of work of earlier years a paper "Regional Influences in Cancer" (*British Journal of Cancer* 1947, p. 109) discusses the distribution and characteristics of factors influencing cancer-deaths in various localities. This is the first application of the new method, Rational Study of Regional Influences (*Papworth Research Bulletin*, 1940) and it is the writer's intention to prepare a paper dealing with the Regional Influences in Tuberculosis, part of the material for which has already been collected.

It is satisfying to be able to record that Dr. P. A. P. Moran of the Institute of Statistics, Oxford, has prepared a paper "The Interpretation of Statistical Maps" (in press) in which the writer's initial work on Map "Patterns" is developed into a formal statistical technique. This should establish and confirm the essential validity of the method.

3. ZINC IN TUBERCULOSIS

The experiment protocols of this latter work have now been reviewed and they disclose some very interesting facts. For example there can no longer be any doubt about the participation of zinc in calcification processes as its relation to Phosphatase Enzyme is brought out most strikingly by comparison with recent work on this enzyme

by Dr. Maurice Murnaghan (Blood levels of Ca, P, and alkaline Phosphatase in relation to Tuberculosis Infection— *Irish J. of Med. Sc.*). Dr. Murnaghan visited the writer here on the instigation of the late Prof. Dillon.

It is hoped to prepare a paper on this subject as soon as time permits. There has been no new experimental work on zinc during the year.

4. HAEMATOLOGY

It has not been possible to make any headway with the "Sedimentation in Wedge Cells" though the requisite special apparatus is now available. An independent memorandum outlining this idea was submitted to the Research Committee some time ago.

The estimations of Post-Transfusion Haematuria continue. Instituted as a routine check on post-transfusions reactions it is revealing some facts of interest regarding blood products from thoracoplasty wounds, etc. As a further check on reactions we have commenced measuring post-operative Eosinophilia, the counts being made by an accurate method. The "Internal Correlations of the Differential Count in Tuberculosis" is also under study.

5. MISCELLANEOUS

Chemical Estimation of Calorie Value of Meals.

Statistical Survey of Calorie Value of Diet. Histidine Excretion in the Urine

1. Pregnancy test.
2. Variations with Menses.
3. Variations with A.P.

Clinical Chemistry

Standard Urinalysis	828
Special (quantitative) Urinalysis	125
Blood Chemistry	31
Test Meals, C.S.F., etc., etc....	129
Food and Drugs	74

Analytical and Research Chemistry

Histidinuria	528
Post-Transfusion Haematuria	288
Milk (Phosphatase, etc.)	402
Water (Hardness, etc.)	333



The Cabinet-making Department.

Bacteriology and Haematology

Sputum ; Direct Microscopy	...	2,124
" " " (Hunts and Beds C.C.)	...	194
" Fluorescence Microscopy		1,810
" Cultures for T.B. (No. of cases)	...	1,075
Cultures (all varieties, T.B. and others)	...	5,133
Microscopical Preparations	...	5,365
Animal Inoculations	...	39
Penicillin Sensitivity, Vaccines etc....		550
Serological tests	...	8
Haematology	...	1,146

Other Activities

Dispensing	...	...	...	1,023
Photography	...	...	...	128

THE VILLAGE

During the year, 2,715 visits were paid to the homes of the settlers and staff in the village by the Village Sister. Five babies were born to our families, all confinements taking place at the County Hospital, Cambridge.

There were five cases of Whooping Cough and three of measles amongst the children during the year. Ten routine visits were paid to the School.

PAPWORTH INDUSTRIES

B. Tallyn, General Manager.

Despite the incredibly bad weather with which the year commenced, coupled with the subsequent breakdown in the country's power-supply, we were able by various improvisations to keep our production moving, although at a much slower tempo.

We had foreseen the probable difficulties which would arise through lack of fuel, and

with the sanction of the Committee of Management, we had taken the precautionary measure of earmarking certain generating-plant to offset the inevitable load-shedding.

Although this plant did not arrive until after the height of the crisis had passed, we found it not only an insurance against further stoppages, but we were enabled to comply with the Government's request to transfer one-third of our power demand from the peak-load period without staggering our working-hours.

Much progress was made in consolidating the advances of the previous year in making the change-over from war to peacetime production.

Space was taken at the more important of the National Exhibitions including the British Industries Fair, the Royal Horticultural Show at Chelsea, and the Royal Show at Lincoln, with gratifying results. Although the demand for our products was considerably greater than the supply available (owing to restrictions in raw materials) we were nevertheless afforded opportunities to meet old customers from home and overseas, as well as to make new contacts for the future.

In the Woodworking Departments we have been largely engaged in manufacturing the Papworth electric "Mammoth" incubator, utility furniture, and school furniture.

The demand for the "Papworth" incubator continues to increase, and the machine has been of considerable help to us in building up and maintaining a very good relationship between ourselves and the poultry-farming industry both at home and abroad.

The high quality of our utility furniture has opened up to us excellent wholesale markets which will be of inestimable value to us when controls are lifted, both from the point of view of design, and the supply of materials.

Our name was included among the firms selected to supply, at short notice, the enormous demand for school furniture created by the raising of the school-leaving age. That we were in a position to tackle this job successfully was in no small measure due to the foresight which resulted in the installation of our battery of timber-drying kilns during the war years.

Owing to circumstances quite outside our control, our export markets for Travelling-Goods showed a tendency to decline during the latter half of the year. This problem

was vigorously tackled, and in addition to redesigning and improving our lines where possible (with special emphasis on the export market) we decided to completely overhaul our method of representation abroad, particularly in the dollar areas. We are convinced that direct representation as distinct from agents and jobbers is the answer to the problem, and certain steps have already been taken which are beginning to justify our hopes.

The policy of completely mechanizing our Printing and Binding Department is slowly taking shape as the machines on order are released by the Ministry. Three of the new binding-machines have already been received and have been of great assistance in reducing physical labour in the Bindery. Our clientèle amongst publishers has been greatly extended, and the rate of expansion in this department is governed only by the paper supply. Even so, the year under review showed the highest turnover in this department to date.

It was impossible during the war years to give the necessary training in Upholstery, as orders for upholstery, as such, were non-existent. We therefore worked out a new specialized training-scheme for this department, and that this policy was right is proved by the evergrowing demand for our utility upholstered furniture.

In addition to the considerable work carried out on the new South Park Block, the Building Department was able to complete thirteen prefabricated houses and three pairs of brick houses during the year. This achievement whilst being an improvement on the previous year, is still far behind our requirements, as the old problem of lack of housing accommodation for those seeking rehabilitation, is still with us.

In concluding this short review, I would like to refer to the exceptional *esprit-de-corps* which exists among the staff and factory personnel, and to thank them for the loyal co-operation which has enabled us to come so well through the many vicissitudes of a difficult year.

B. TALLYN

THE SOCIAL LIFE

A full account of the social life of Papworth would fill many pages of this report, and it would be found to be but a section of the life of the world at large, with its innumerable social, religious and sporting activities.



The Chamberlain Memorial Workshop for Travel Goods. Inset : a section of the Leather Case-making Shop.



The Assembly Shop, Cabinet-making Department.

At Papworth we have our Parish Council, our Horticultural Society with its summer and autumn shows, our Nursing Association with its Women's Library, the Wesley Guild, W.E.A. classes, the Dramatic Club, the Old Time Dance Club, the Billiards and Snooker League, the Youth Club, Red-Cross Cadets, Army Cadets and so forth. The various residential hostels have their social clubs and libraries and hardly a week passes without some dramatic or musical entertainment provided by friends of Papworth.

In particular we are indebted to the following for their generous help during 1947:

The Cambridge Brotherhood Band for their annual Christmas-morning carol concert;

Mrs. Norris for "Stars in Variety," St. Columbia's Church, Cambridge; and the Army Entertainment Service for ward shows;

The Army Kinema Corporation and the Central Office of Information, also Mr. Cunningham, Cambridge, for ward film shows;

Miss Alice Reynolds and the "Variety Highlights";

Miss Joan Metcalfe and her "Aladdin" Company;

St. Ives A.D.C. for "Grumpy";

Mr. Wilfred Pinney and his friends for "While the Sun Shines";

The Rev. E. K. Payne, the Catholic Chaplain, for concerts of recorded music;

The British Council for "Intimate Opera".

We were also pleased to welcome, and provide the theatre for, the competing teams for the Cambs. Drama Festival Area Finals.

T. C. M. JOHNSON.



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